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CONTENTS.

SUMMARY: —
Prizes for Studies of Old Buildings. — Colonial Architecture. — The New Archæological Society. — The Improved District of Glasgow. — The Housing of her Poor. — The Chicago Custom-House Trials. — The Metric System and the Engineers 153
THE OPEN FIRE-PLACE. XII. 155
THE ILLUSTRATIONS: —
Tenement-House Plans. — Chemical Engine Station, Syracuse, N. Y. — Papier-Maché Capitals. — Doorway at Cairo. — House at New Brunswick, N. J. 156
THE EXHIBITION OF CONTEMPORARY ART IN BOSTON. II. 157
CORRESPONDENCE: —
Letter from Cairo 158
Letter from Boston 159
COMMUNICATION: —
Western Architects 159
NOTES OF EXPERIENCE AND INEXPERIENCE 160
NOTES AND CLIPPINGS 160

WE wish to remind our readers, especially our younger professional readers, of the appeal made lately by the Boston Chapter of the Institute for drawings illustrating the old architecture of New England, especially that of the colonial time. The immediate offer of prizes to draughtsmen by the Chapter is necessarily a stimulus of but limited range; we should be glad to see a more general interest in the subject grow up, for it is an important subject. Not only is there much that is interesting, both of design and of detail, in the colonial work, much that is serviceable for purposes of study, and artistically pleasing, but there are many questions of interest concerning the history and sequence of our architecture which can be solved only by careful examination of our old buildings, with comparison of dates and localities, — a mode of study which has, as far as this subject is concerned, been almost absolutely neglected. To mention one, there is the question of the old gambrel roof, very common in the Northern States a century ago. When was it first used, and when given up? Where did it come from? It may be said roughly to have been used as early as the seventeenth century, and to have been given up after the Revolution. But was it an indigenous construction which grew up out of practical wants among our Northern farmers? or was it an importation, and if so, from whom? The obvious suggestion that it is substantially the French mansard roof, and must have been copied after it, does not seem to be borne out by evidence. It has been suggested that it was copied into New England from the buildings of the Dutch settlers in New York. If this should prove to be the case, where did the Dutch settlers first find it? Its prototype is not to be seen, we believe, among the old houses of Holland. These questions might be answered by careful comparison of a good number of the older examples, if people could be found to make accurate record of them, with attention to their dates. Many other questions which would arise could in like manner be solved, and much interesting information be got together, if there were any one to collect examples with the necessary precision.

THERE is still much of the old work left, but every year more and more of it is pulled away to make room for more pretentious, but commonly inferior work, or falls into ruin from neglect and decay. A great many handsome old houses survive in the quieter and older New England country towns; for in the colonial days the magnates did not crowd into the largest cities as leading men do now, nor was the preëminence of a few towns fixed as it is now. In some regions of New York there still remain the quaint farm-houses of the early Dutch settlers. In the older Southern States, where there has been less disposition than at the North to replace the work of early days, and, we believe, especially in Virginia, a great many fine old manors, and some churches and civic buildings, still tell of colonial grandeur. Architects, draughtsmen, or amateurs who will take the trouble may do good service if they will lend a hand in keeping this inheritance of good work from being forgotten. The young men in the profession will find their especial account in the careful study of what is often superior in character and refinement of detail to contemporary work. But many valuable records may be preserved without the help of professional skill. Any one who has the patience to be thorough, and skill enough — it does not need a great deal — to take accurate measures and to profile mouldings with precision, can make a useful record. If artistic sense and professional knowledge are present it is a great gain, but the essential thing is intelligent exactitude. There is already, to be sure, a great amount of picturesque representation. Books and periodicals contain an immense quantity of artists' sketches of old buildings. These have their value as suggestions; but for history or criticism, still more for instruction, they are worthless.

IN answer to the circular which we mentioned a fortnight ago, and to a subsequent call, a preliminary meeting for the founding of a Society for Archæological Research was held in Boston last Saturday. The forty persons who attended showed that there is a serious interest in the object for which the society is to be formed, while the remarks of the chairman and others of the speakers indicated that when definite work was undertaken in the way of exploration, the necessary funds would probably be raised without difficulty. There was more or less discussion of the proper field for the work of such a society, the prevailing opinion being that while the whole range of American and foreign archæology claimed its attention, in view of the provision already made by other institutions — the Smithsonian Institution and the Peabody Museum, for instance — for the study of American antiquities, it was well to turn the first attention of the society to some of the important and thus far neglected fields of exploration in classic archæology. A committee was appointed to prepare a scheme of organization for the society, and report at a second meeting, to be held to-day. The objects of this association are of special interest to architects, and it is to be hoped that they will take an active part in its work. An archæological society without architects is like a legislature without lawyers.

IN the discussions that we have heard of late concerning various ways of improving the lodgement of the poor in cities, the improvements which have been made in Glasgow during the last dozen years have often been spoken of. These improvements are not of a kind which we are likely to see copied in our own cities; but they are interesting on account of the shrewdness with which they were managed, and for their striking contrast to the lordly and extravagant alterations that went on conspicuously in Paris at about the same time. Sir James Watson, who for six years was chairman of the committee to whom the corporation of Glasgow intrusted the management of the improvements, read last month a paper on them, before the Royal Institute of British Architects, which we find reported in the English building journals. Glasgow is a very old city, going back to the dark ages, and parts of its cathedral dating from the twelfth century. Like all mediæval towns, it was densely built, and until 1866, when the improvement act was passed, the lines of the mediæval streets in the older parts of the town appear not to have been disturbed, though the buildings had been replaced, and in the unexampled growth of the population had become crowded beyond the example of any European city. It was a maze of narrow and filthy streets, lanes, and blind alleys or "closes," often not two yards wide, lined with tall old decaying houses, in which swarmed a population that outdid even that of the New York tenement houses, there being sometimes, it is said, as many as a thousand to the acre. This condition of things was so intolerable that in 1866 the corporation and its architect devised a plan for redeeming a large tract, amounting to eighty-eight acres, — the whole of the ancient town, in fact, — and laying it out anew. They got authority from Parliament to purchase the property and tear down the buildings, and they redistributed the whole among no less than forty-five new or enlarged streets. To meet the cost of this the citizens were persuaded to submit to a tax on rental of six pence in the pound for five years, and two pence for ten years longer; but the tax, proving very unpopular, was reduced to four pence after the first year. The ground was purchased from time to time and cleared, and then, the intended streets being laid out and sewered, was resold under proper restrictions, to be built upon by the new owners. So well was the whole thing managed that the raising of about three hundred and fifty thousand pounds by taxation furnished sufficient capital for all the improvements,

including the purchase of land to the amount of nearly a million and three quarters sterling; and Sir James Watson estimates the net cost to the city of the improvement, including suits lost and interest on the cost of land idle during the transfer, as well as all expenses of management, at about one hundred and eighty thousand pounds.

The way in which the thing was done does credit to the cleverness of the shrewd Scotsmen who controlled it, as well as to the citizens who supported it. The corporation did not rush into the market at once as a wholesale buyer; but, acting through "a judicious person," it approached the owners singly and privately, buying at first such land as they were readiest to sell, and so getting possession during the first year of only about fifty thousand pounds' worth of land and buildings, but at very moderate rates. Whether on account of public opinion, or the shrewd dealing of the committee, there seems to have been little blackmailing of the city by putting fancy prices on the land which was to be taken. This was partly due to a clever device. It was ruled that no striking improvement, such as should enhance the value of land at any point, should be undertaken until all the land affected by it had been purchased. The purchase and the alterations went on slowly. For two years nothing was done but to put the buildings secured into repair, keeping them occupied, and to open up here and there access for light and air. Then the work of removing the old houses began, and went on as the land was gradually bought in, the worst and most unwholesome being destroyed first. Care was taken not to evict the tenants faster than room could be found for them elsewhere. At first two large plots of ground in the neighborhood were purchased, graded, and sewered, at a cost of about eighty thousand pounds, and parcelled out among builders who would put up houses to be let to workmen at moderate rates. This was accomplished with a profit of fifteen thousand pounds. But the knowledge that the inhabitants of the rookeries would be dispossessed quickly set owners elsewhere to building houses and tenements for them as fast as they were wanted, and even faster. The ground thus reclaimed from the centre of the city naturally brought too high a price to allow of using it for dwellings of the poorer classes, and as the wider streets were opened through it they were built up with shops and warehouses, or with houses for the middle class, while, as usually happens, the poorer classes found their homes in the outskirts. In the interest of these classes, ordinances have been passed requiring that all plans for buildings shall be under the supervision of appointed officers, and fixing definite restrictions upon those used for dwellings and tenement houses, — such as that no room shall be used as a bed-chamber unless it looks out upon a street or other open space three fourths as wide as the height of the wall of the building, and that in the new streets no house shall be higher than the width of its street; all rooms must be at least ten feet high, and when a single room is let as a tenement it must contain not less than 700 cubic feet of air space, or in a new building, 900; if a tenement includes two rooms they must together contain 1,200 cubic feet, or in a new building 1,500; if three rooms, 1,800 feet, in a new building, 2,000. It is also ordered that in sleeping-rooms there must be for every occupant eight years old or upward 300 feet of space, or for every child of less than eight years 150 feet. Thus, although the poor in Glasgow, as in other cities, have been driven away from the centre, special care has been taken to eject them with as little hardship as possible, and that their new homes shall be a great improvement on the old.

The trial of the eight persons sweepingly indicted last fall, for conspiracy to defraud the Government in the matter of the stone-work of the Chicago Custom-House, was begun last week at Chicago. These persons, it will be remembered, were Messrs. Mueller, the contractor, and Mills, his clerk; the two successive Supervising Architects, Messrs. Potter and Hill; the two superintendents, Burling and Prussing; and the foremen, Reed and Wheaton. The counsel for Messrs. Mueller, Mills, and Reed began with an effort to stave off proceedings by moving to quash the indictment. This was opposed by Messrs. Potter and Hill, who wished that the trial should proceed without delay. Mr. Potter's counsel, however, moved for a bill of particulars, on the ground that the indictment charged no definite acts upon his client. The counsel who moved to quash the indictment remarked with curious indifference, it would seem, to the effect of his declaration, that some of the defendants were opposed to any dilatory motions, but that "the gentlemen he represented had no such queer notions of delicacy." The court, after taking the motions into advisement, decided against both, saying that the indictment, though not perfect, would stand, and that it was definite enough to show the defendants what was the charge against them, and the court what was the penalty to be inflicted in case of conviction. These points being settled, and the jury empanelled, the case is fairly under way. It may well be a long case, the defendants being many and not particularly harmonious, — so little so, in fact, that Mr. Potter's counsel made a point of the persistent antagonism between his client and Mr. Mueller, asserting that it would have been as reasonable to indict Grant and Lee for conspiracy. The array of documents to which the various counsel may betake themselves is nothing less than appalling to those who have tried to follow the controversies over the Custom-House in their earlier stages. It will also be a trial of great interest to the public if it is not prolonged beyond endurance. For the sake both of the public and of the defendants we may hope that the real issues will not be obscured by merely technical fence. The public will wish not only to know that its officers have not been tripped up in the trial, but to feel sure that they have done no wrong. Those who care anything for the defendants will take less comfort in knowing that the prosecuting officers have failed to maintain the specific allegations of an indictment, which under a charge of conspiracy is always a difficult thing to do, than in a clear indication that there is no fault to be found; and will look complacently on any queer notions of delicacy that tend to let in a full and vindicating light on their conduct.

At the beginning of the present session of Congress the Boston Society of Civil Engineers submitted to both houses a memorial, praying for certain enactments to carry out the recommendations of the House Committee on Coinage, Weights and Measures of the last Congress. These enactments were that after July 1, 1881, the fifteen gramme rate should be substituted for the half ounce in the post-offices, all the offices being furnished with metric balances, for which an appropriation of fifty thousand dollars should be made; and that from the same date metric weights and measures should be made obligatory in the transactions of the custom-houses of the United States. These recommendations are probably as well-judged as any that can be offered for the acceleration of a change which it is plain to see will come in no long time; but we can hardly hope that our rulers will at present find time to discuss them or to order them. The practical adoption of a new standard of weights and measures is not to be expected till the Government orders it, and it is to government undertakings and business that we may look to familiarize people with its working: but this we may not hope to see till the people themselves are pretty well prepared for the change, for it is not a matter in which we can expect Congressmen to go in advance, whatever may be the recommendations of their better informed committees. The advocates of the change must therefore still rest their hopes upon public instruction, which has already made provision for the subject in the schools of many cities and towns, and to the persuasions of those classes of men who are most interested in the movement. These do not always move as fast as we might expect, for we find that the Association of Civil Engineers of the Northwest has only at its latest meeting, held last week, received the report of the committee which it appointed three years ago to consider the introduction of the metric system. The judgment of the committee, set forth in their report, is wise, we think. They believe that the change must come, and that when it comes it will be worth more than its cost. But they "do not see that it can be forced by legislation upon an unwilling or even an indifferent and uninformed people." They therefore urge the value of school instruction in the metric system, quoting from a hopeful letter of the Chicago Superintendent of Schools: "We intend to have all our grammar-school pupils get a good knowledge of the metric system; for by the time they become men and women, no other system of weights and measures will be used in this country." The report also recommends, inasmuch as the use of the metric system by the Government is the best means of habituating the people to it in practice, that the association shall join with the Boston club in its memorial to Congress, and would add the recommendation that after the date fixed in it all material bought, or work done, by the Government shall be measured by metric standards, except in case of work begun or contracted for before that date.

THE OPEN FIRE-PLACE. XII.

EXPERIMENTS WITH THE "FIRE-PLACE HEATER."

THE first of our experiments with the "Fire-Place Heater" were made on the 1st of January, 1879, when the external air stood at 0° C. At the beginning of the experiment, the thermometer in the room stood at 11.25° C.; four kilograms of dry pine wood were burned. At the end of half an hour the mercury had risen to 15.50° C., and from thence it began gradually to fall as the fire went out, until at the end of an hour it stood at 15°. The fresh air was conducted to the back of the heater through a brick flue opening to the outer air under the window. It entered the room warmed through two openings just under the mantel, right and left, over the heater.

The following table gives the result of the test: —

TABLE III.

Remarks.	Time.	Temperature of Room.	Temperature of Air entering through Left-hand Register.	Temperature of Air entering through Right-hand Register.	Velocity of Current entering through Left-hand Register, in Meters, per Minute.	Velocity of Current entering through Right-hand Register, in Meters, per Minute.	Cubic Meters of Air entering through Left-hand Register, per Minute.	Cubic Meters of Air entering through Right-hand Register, per Minute.	Equivalent in Cubic Meters raised 1° (Left-hand Register).	Equivalent in Cubic Meters raised 1° (Right-hand Register).
	1	2	3	4	5	6	7	8	9	10
Fire lighted; 2 kilograms on.	1.00	11.25°	4°	2°	72	90	.97	1.17	3.88	2.34
	5	12	10	8	99	84	1.34	1.09	13.40	8.72
Third kilogram put on.	10	13	20	9	100	96	1.35	1.25	27.00	11.25
	15	13.50	30	10	94	96	1.27	1.25	38.10	12.50
	20	14.50	31	13	96	96	1.30	1.25	40.30	16.20
	25	15	32	13	100	96	1.35	1.25	43.20	16.20
	30	15.50	32	14	102	96	1.38	1.25	43.50	17.50
	35	15	32	14	96	96	1.30	1.25	41.60	17.50
Fourth kilogram put on.	40	15	32	14	96	96	1.30	1.25	41.60	17.50
	45	15	32	15	96	96	1.30	1.25	41.60	18.70
	50	15	32	14	90	90	1.20	1.17	38.70	16.30
	55	15	31	10	90	90	1.20	1.17	37.50	11.70
	2.00	15	30	8	85	90	1.17	1.17	35.10	9.37
							16.41	15.77	445.48	175.77
							5	5	5	5
							82.05	78.85	2,229.90	878.85

The table shows us that three kilograms of wood burned in this fire-place raised the temperature of the room 4¼° C., or over four times as much as the same amount burned in the ordinary fire-place accomplished.

The heat saved from the back of the fire-place was sufficient to raise the temperature of 2,229.90 + 878.85 = 3,108.75 cubic meters of air 1° C. Or, since one cubic meter of air weighs 1.3 kilograms, 3,109 cubic meters would weigh 4,041.7 kilograms, and the specific heat of air being 0.24, we have 4,041.7 × 0.24 = 970 heat units saved. Add about $\frac{1}{16}$ for heat still remaining in the back and sides of the fire-place at the end of the experiment, and we have a total of about 1,000 units of heat saved by this apparatus in every 4 kilograms of wood.

If we assume as before that 1 kilogram of our dry wood yielded 3,590 units of heat in the process of combustion, 4 kilograms would have yielded 14,360 units. Therefore, our 1,000 units saved would be equivalent to 7 per cent of the whole amount of heat possible to be obtained from the fuel. Add 6 per cent for that due to direct radiation, and we have 13 per cent utilized, or over twice as much as was obtained from the ordinary fire-place. With coal the amount of heat utilized would be 7 + 13 = 20 per cent, or the same as is obtained from the apparatus of Fondet, according to the calculations of General Morin. If, in connection with this heater, the double flue of Belmas or Galton is used, as is recommended by the manufacturers, the saving may be 5 or 10 per cent greater, making a total of 25 or 30 per cent. In order that the conditions under which this heater was tested might be as nearly as possible the same as those attending the test made on the old fire-place recorded in Table I., another experiment was made later in the season, when the thermometer of the external air stood at 13° C. The air of the room was raised by the combustion of 3 kilograms of wood from 17° to 21°, or again, 4° C., and in all the experiments the temperature in all parts of the room was very nearly the same. The entrance of cold currents through door and window cracks was almost entirely avoided. The movement in the air was perceptible, yet the ventilation was perfect, and no disagreeable odor was perceptible for any length of time, even after the room had been filled with mechanics and laborers. We see by columns 7 and 8 that there passed into the room a ventilating current of warm air at the rate of over a cubic meter a minute from each of the two registers, making together in the hour over 160 cubic meters. This air was at no time heated above 32° C., and averaged about 22°, — a mild and pleasant temperature.

A test was also made at the top of the chimney to ascertain the temperature of the air as it issued from the mouth. The thermometer rose as high as 82°, and then began to fall. By Table I. it will be seen that the temperature with the old fire-place rose to 84° and 90°. The difference by this test was, therefore, apparently unimportant, though a careful measurement, with the anemometer and thermometer, of the heat units thrown out would have shown a saving corresponding with that detected below.

Fig. 113.

Fig. 113 gives a sectional cut of another fire-place manufactured by the same company. This apparatus consists of a double stove, the inner one being used to hold the fuel and carry off the products of combustion, and the space between the inner and the outer serving to warm the fresh air to be introduced into the room. If a blower be used over the fire, the open fire-place is converted into a close stove or furnace, with fresh-air flues, etc. It is unquestionably one of the most satisfactory stoves known in this country, designed for combining health with economy.

THE DIMMICK HEATER.

We now have manufactured in this country another excellent ventilating fire-place, called the Dimmick Heater, of which Figs. 114 and 115 give perspective view and vertical section.

The principle of this heater is the same as in the apparatus represented by Figs. 76 and 77. It has, however, this advantage over

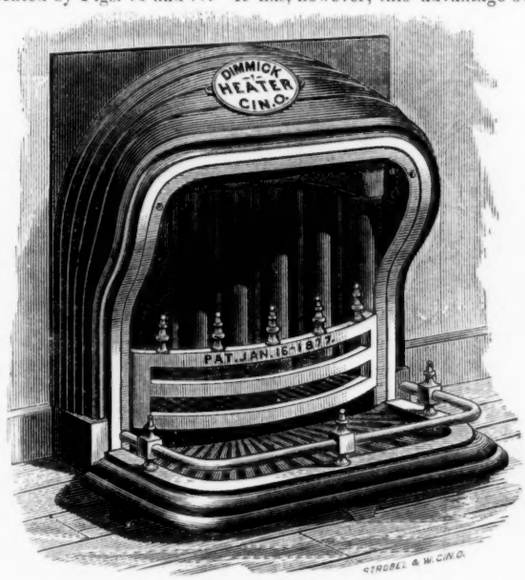


Fig. 114.

the latter, that the upright fresh-air tubes are joined together so as to form an air-tight fire-back, and enter a common hot-air chamber directly over the flame, having its lower side inclined at an angle with the back so as to reflect the heat into the room and throw the flame forward. This arrangement of the tubes and hot-air box gives the fire-place a more desirable section for radiating heat. As for the artistic effect of the exterior, none of the ventilating fire-places heretofore represented have much to claim, and in the present case it is possible to conceive of a form more pleasing than that represented in our cut. But a slight modification in the treatment of the hood would probably be sufficient to remove all objection on the score of appearance.

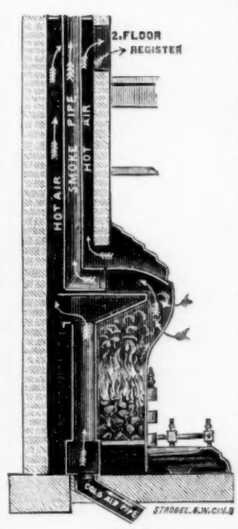


Fig. 115.

The fresh air, after having been heated in the tubes and box, is either conducted immediately into the room through registers opening under the mantel, or it rises in a double flue to the ceiling or to the rooms above, as shown in the section (Fig. 115).

In order to make an accurate test of the heating power of this fire-place, the writer had one placed in the room in which the previous experiments were made, and obtained the following results: —

EXPERIMENTS WITH THE DIMMICK HEATER.

The heater was set out in the room in front of the mantel, and the fresh air conducted through a brick flue direct from the outside

to the iron chamber under the upright tubes. The heated air entered the room through two openings perforated in the upper hot-air box over the fire already described, one at the right, having an area of 40 square centimeters, and one at the left, having an area of 104 square centimeters, and it was assumed that the volume of the fresh air given out by each was in proportion to the size of the opening, while the temperature was the same. The observations were made upon the right-hand opening. In order to protect the thermometer from the direct radiation of the iron, a brick flue was built around this opening and carried outwards horizontally about eight inches, and thence upwards about a foot, so that a thermometer hung in the upright portion of the flue would indicate with greater accuracy the temperature of the hot-air current and not be greatly influenced by radiation from any outward source.

At the time of the experiment recorded in the following table, from nine to eleven o'clock in the evening of April 11, 1879, the outside air stood at 4° C., and the air in the room at 16°. The anemometer was again tested in a current of air of known velocity, and found to be accurate. The allowance to be made for friction was recalculated, and found to agree with that made in the previous tests.

Three kilograms of dry pine wood were burned, and the amount of ventilation effected and heat saved by the apparatus is shown by the following:—

TABLE IV.

Time.	Temperature of Fresh Air entering the Room through the Register.	Velocity of the Air in Meters, per Minute.	Volume of Fresh Air in Cubic Meters, per Minute.		Difference between External Air and Air entering the Room through the Register.	Equivalent in Cubic Meters raised 1° Centigrade.		General Remarks.
1	2	3	4		5	6		7
8.50		16						
51								
52	12° C.	18	.072		80	**0.6**		Fire lighted.
53	**14**	**18**	**.072**		**10**	**0.7**		
54	**16**	18	.072		**12**	**0.9**		
55	**18**	**25**	**.1**		**14**	**1.4**		
56	20	39	.136		16	2.17		
57	**25**	**40**	**.13**		**21**	**3**		
58	29	42	.168		25	4.2		
59	38	45	.180		34	6.1		
9.00	45	51	.204		51	10.4		Second kilogram put on.
1	**50**	**52**	**.20**		**46**	**11**		
2	**55**	**53**	**.20**		**51**	**12**		
3	**60**	**54**	**.21**		**56**	**13**		
4	**65**	**55**	**.22**		**61**	**14**		
5	70	57	.228		66	15.0		
6	77	57	.228		73	16.6		
7	83	57	.228		79	18.0		
8	88	**58**	**.23**		84	**19**		Third kilogram put on.
9	90	60	.240		86	20.6		
10	93	63	.254		91	22.9		
11	101	**64**	**.24**		97	**24**		
12	103	66	.264		99	26.1		
13	108	**70**	**.27**		104	**28**		
14	112	72	.288		108	31.1		Fire begins to decline.
15	116	**70**	**.27**		112	**30**		
16	118	**68**	**.26**		114	**30**		
17	120	66	.264		116	30.6		
18	121	63	.252		117	29.5		
19	120	**62**	**.25**		116	**28**		
20	119	**61**	**.24**		115	**27**		
21	118	**60**	**.24**		114	**27**		
22	116	60	.240		112	26.9		
23	**116**	**59**	**.23**		**112**	**26**		
24	115	**58**	**.22**		111	**25**		
25	112	57	.228		108	24.6		No more flame.
26	108	**56**	**.22**		104	**23**		
27	107	**55**	**.22**		103	**22**		
28	**105**	**54**	**.21**		**101**	**22**		
29	103	54	.216		99	21.4		
30	100	**53**	**.21**		96	**20**		
31	99	**52**	**.20**		95	**19**		
32	96	**51**	**.20**		92	**18**		
33	**93**	**50**	**.19**		**89**	**17**		
34	**91**	**49**	**.19**		**87**	**17**		
35	89	48	.192	9.27	85	16.3	801.1	Cinders turning black.
40	80	42	.168	.9	76	12.3	75	
45	70	**40**	**.15**	.8	66	**10**	55	No more sparks visible; cinders all black.
50	**65**	**37**	**.14**	.7	**61**	**8**	45	
55	57	**34**	**.13**	.6	53	**7**	40	
10.00	**50**	**31**	**.12**	.6	**46**	**5**	30	
5	**45**	**28**	**.11**	.5	**41**	**4**	22	
10	40	25	.100	.5	36	3.6	20	
15	**38**	**25**	**.10**	.5	**34**	**2**	15	
20	35	**25**	**.09**	.4	31	**2**	10	
25	**33**	**24**	**.08**	.4	**29**	**2**	10	
30	**31**	**23**	**.07**	.3	**27**	**2**	10	
35	**29**	**23**	**.06**	.3	**25**	**2**	10	
40	**27**	**20**	**.05**	.2	**23**	**1**	8	
45	**25**	**20**	**.05**	.2	**21**	**1**	7	
50	**23**	**20**	**.05**	.2	**19**	**1**	6	
							5	
							4	
							3	
							2	
							1	
							0.9	
				16.4			1,180	

Note.—Results obtained by calculation are indicated in heavy figures.

This table shows us (column 7) that the heat saved from the back of the fire-place and issuing with the air through the right-hand opening of 40 square centimeters area was sufficient to raise the temperature of 1,180 cubic meters of air 1° C. The other opening, having an area of 104 square centimeters, must therefore have given out heat sufficient to raise $1,180 \times \frac{104}{40} = 3,068$ cubic meters of air 1° C., the two making a total of $3,068 + 1,180 = 4,248$ cubic meters. Since, as before, 1 cubic meter of air weighs 1.3 kilograms, and the specific heat of air is 0.24, we have $4,248 \times 1.3 \times 0.24 = 1,325$ heat units saved by this apparatus in every 3 kilograms of wood.

Assuming that the 3 kilograms of wood here used yielded 10,770 heat units in the process of combustion, our 1,325 units saved would be equivalent to $\frac{1325}{10770} = 12$ per cent of the whole. Add 6 per cent for that due to direct radiation, and we have 18 per cent for the total amount of heat realized from the fuel, or just three times as much as was obtained from the ordinary fire-place. With coal the amount of heat utilized would be $12 + 13 = 25$ per cent, or 5 per cent more than is obtained from the apparatus of Fondet, according to the calculations of General Morin. If, again, in connection with the Dimmick Heater, we use the upright double flue as shown in the sectional cut, the heat realized is increased 5 or 10 per cent, making a total of 30 or 35 per cent. It therefore appears from these experiments that the calorific power of the Dimmick Heater is somewhat greater than that of the "Fire-Place Heater." But, whereas the latter threw into the room during the combustion of 4 kilograms of wood, as shown by columns 7 and 8 of Table III., $82.05 + 78.85 = 160.90 + (\frac{1}{20} \times 160.9) = 169$ cubic meters of air heated on the average to a mild temperature of 22° C., and at no time exceeding 32° C., the Dimmick Heater supplied only $16.4 + (\frac{1}{20} \times 16.4) = 17$ cubic meters through the right-hand opening, and $17 \times \frac{104}{40} = 44$ cubic meters through the left-hand opening, or a total of 61 cubic meters during the combustion of 3 kilograms of wood. Or for 4 kilograms $61 + \frac{1}{3}(61) = 80$ cubic meters heated during 20 minutes of the time up to 100° C., or the boiling point of water, and at one time as high as 121° C. By using a fire-clay back in front of the cast-iron tubes, and by either increasing the size of the fresh-air passages or else allowing the fresh air to circulate behind the tubes as well as through them, the heater might be materially improved, and a still greater percentage of saving obtained. This improvement might be made in setting, without altering the castings. The cold air entrance pipe shown in Fig. 115 should be increased in size, and should relieve the air behind as well as under the upright pipes. It should be provided with a simple damper to diminish the supply of cold air at pleasure to correspond with the ventilation required or the amount of fuel burned. The air passing up behind would then serve not only to lower the temperature of the pipes themselves by extracting some of the heat which would otherwise pass off by absorption, into the brickwork, but also to diminish, by dilution, the heat of the air issuing from their tops, and improve the ventilation of the apartment by introducing into it a larger volume of air heated to a lower temperature. Even as it is, it ranks as one of the best and most powerful ventilating fire-places of its kind yet known to the public. It is advertised at from $10 to $50, with $10 extra for flue to carry heat to ceiling or to story above.[1]

THE ILLUSTRATIONS.

THREE PLANS FOR TENEMENT HOUSES RECENTLY SUBMITTED IN THE "PLUMBER'S" COMPETITION.

The design by "Octagon" provides that the cellar, the basement in the rear, and all yards are to be paved with brick, set on edge in cement mortar on a bed of sand 6 inches thick. The floors over the cellar and first story are to be of 4-inch brick arches between iron beams; all other floors are to be supported by 9 inch by 11 inch spruce beams two feet apart from centres; flooring to be of 1½-inch pine planks. Risers of stairs to be of face brick; treads to be sandstone slabs 3½ inches thick, supported at one end by open-arched brick walls, at the other by angle iron riveted to a 10½-inch iron beam. Mantel shelves to consist of moulded sandstone slabs, supported by two sandstone corbels. Estimated cost, $14,200. Rents to range between $6 and $12 per month.

The design by "Seven per Cent" provides—

(1.) No dark rooms.

(2.) A water-closet for each tenement, well ventilated, and accessible privately.

(3.) Stairs "open to the air," as required by the conditions of the competition.

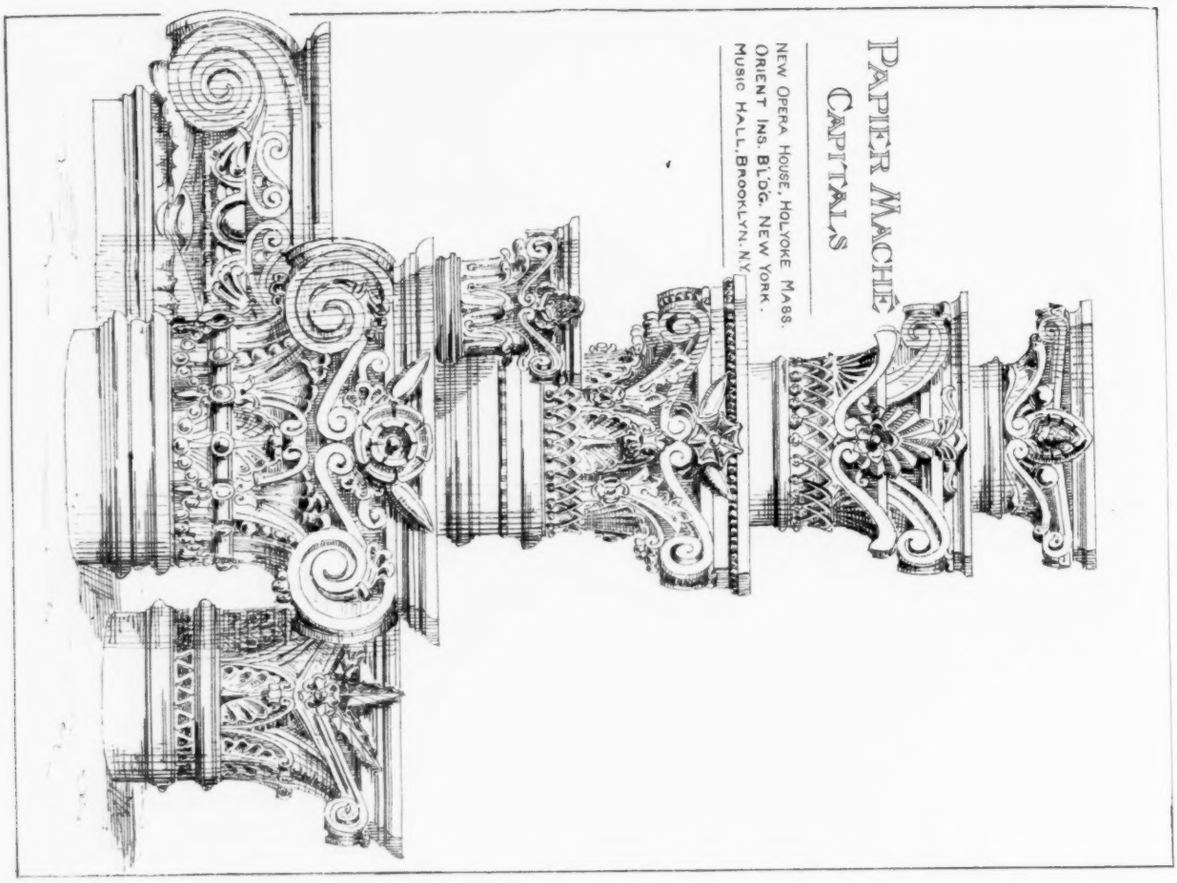
(4.) One good-sized central area for light and air in place of two small ones.

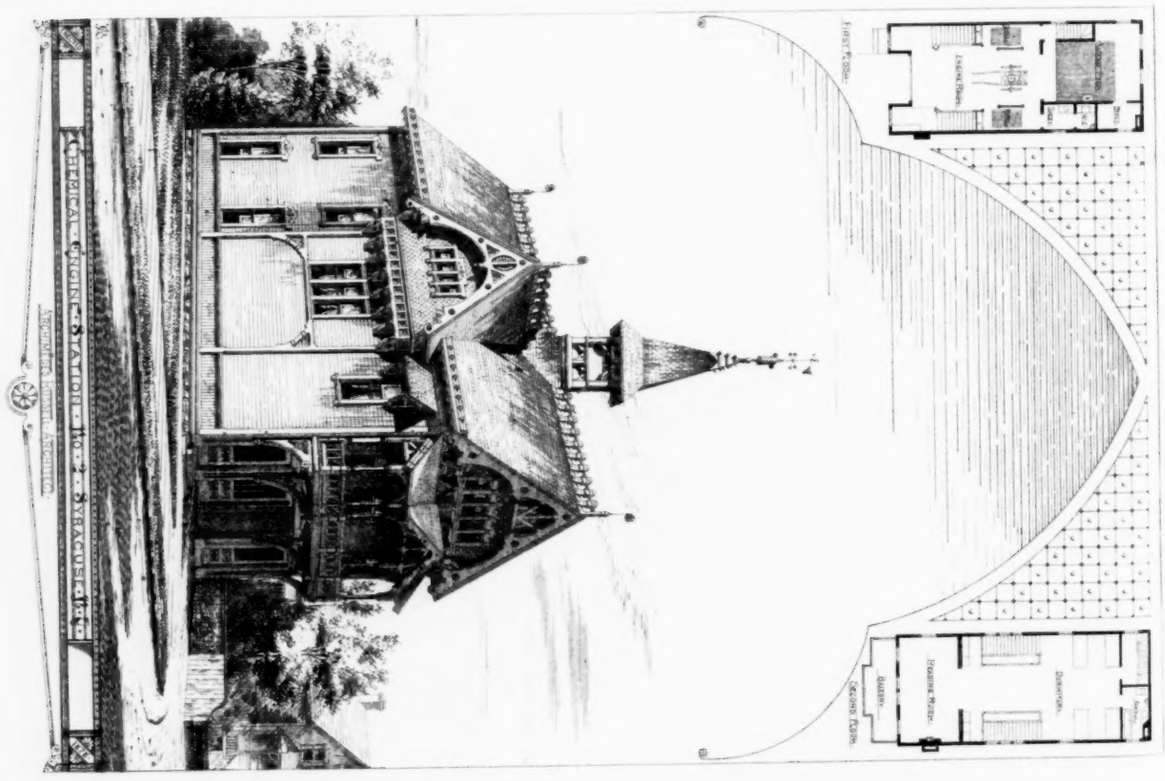
(5.) Tenements of one room, two, three, or four rooms, at the option of the tenant, each complete in itself in any case.

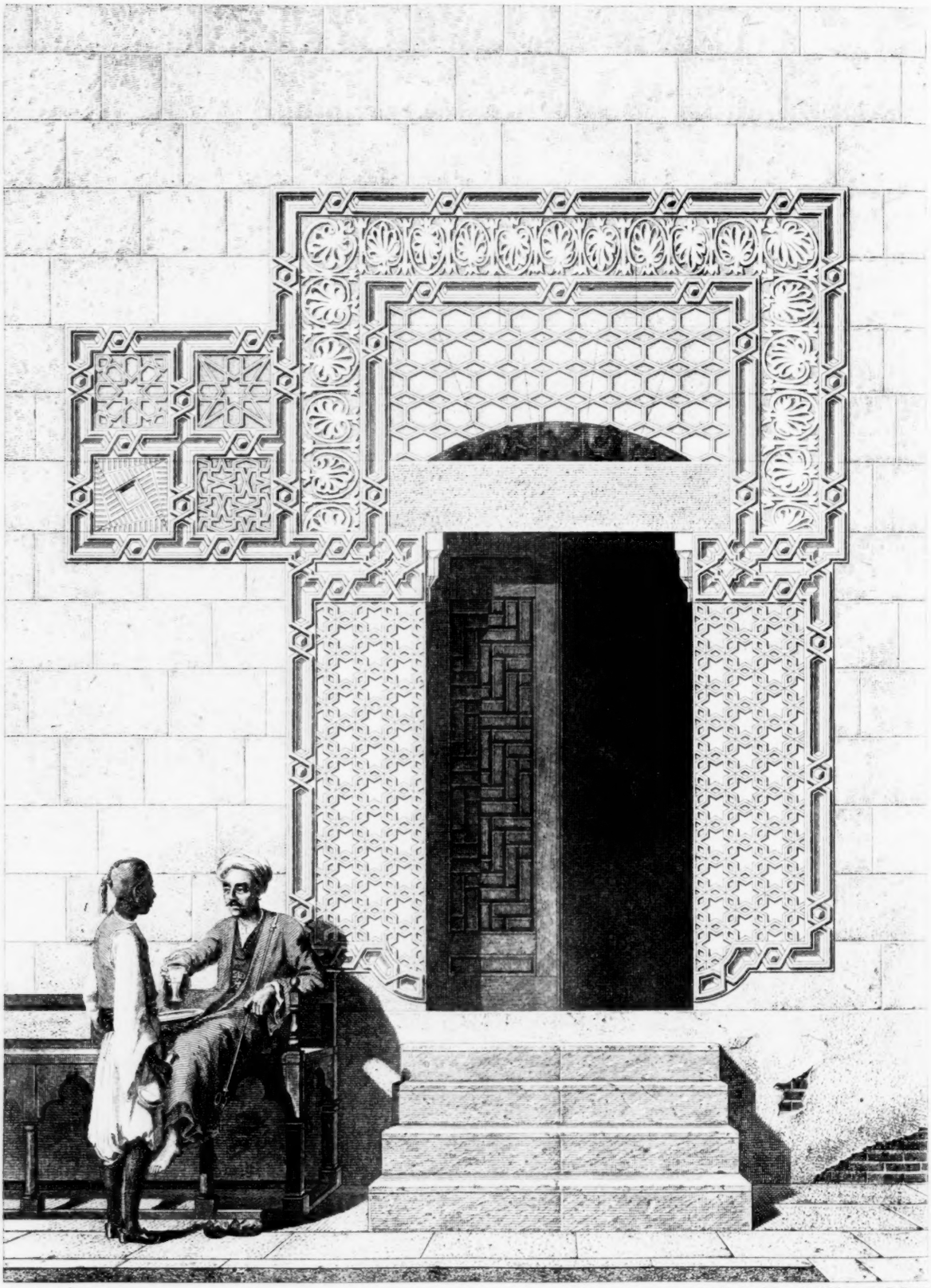
Gas lighting was suggested and estimated on account of "security against fire" (a main point in the conditions), though of course it is not essential to the plan.

The shell of the building as designed by "Prüfet Alles, das Beste behaltet" is intended to be of brick, while the interior partition walls would be of cast hollow cement blocks. The floors rest on beams eight inches square and two feet on centres, the spaces be-

[1] It can be had of the Dimmick Heater Company, Cincinnati, Ohio.


PAPIER MACHÉ
CAPITALS
NEW OPERA HOUSE, HOLYOKE MASS.
ORIENT INS. BL'DG. NEW YORK.
MUSIC HALL, BROOKLYN, N.Y.


CHEMICAL ENGINE STATION. NO. 2. SYRACUSE, N.Y.



Bunel arch^te del

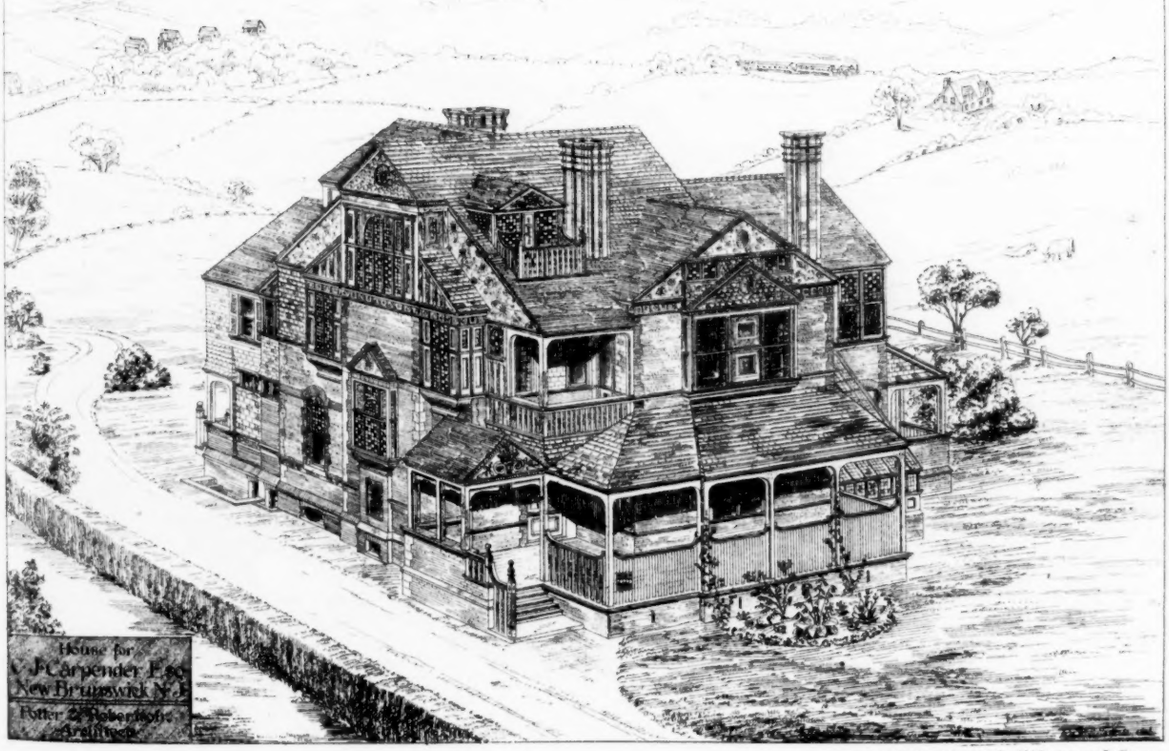
THE HELIOTYPE PRINTING CO. 280 DEVONSHIRE ST. BOSTON

ARAB DOORWAY AT CAIRO.

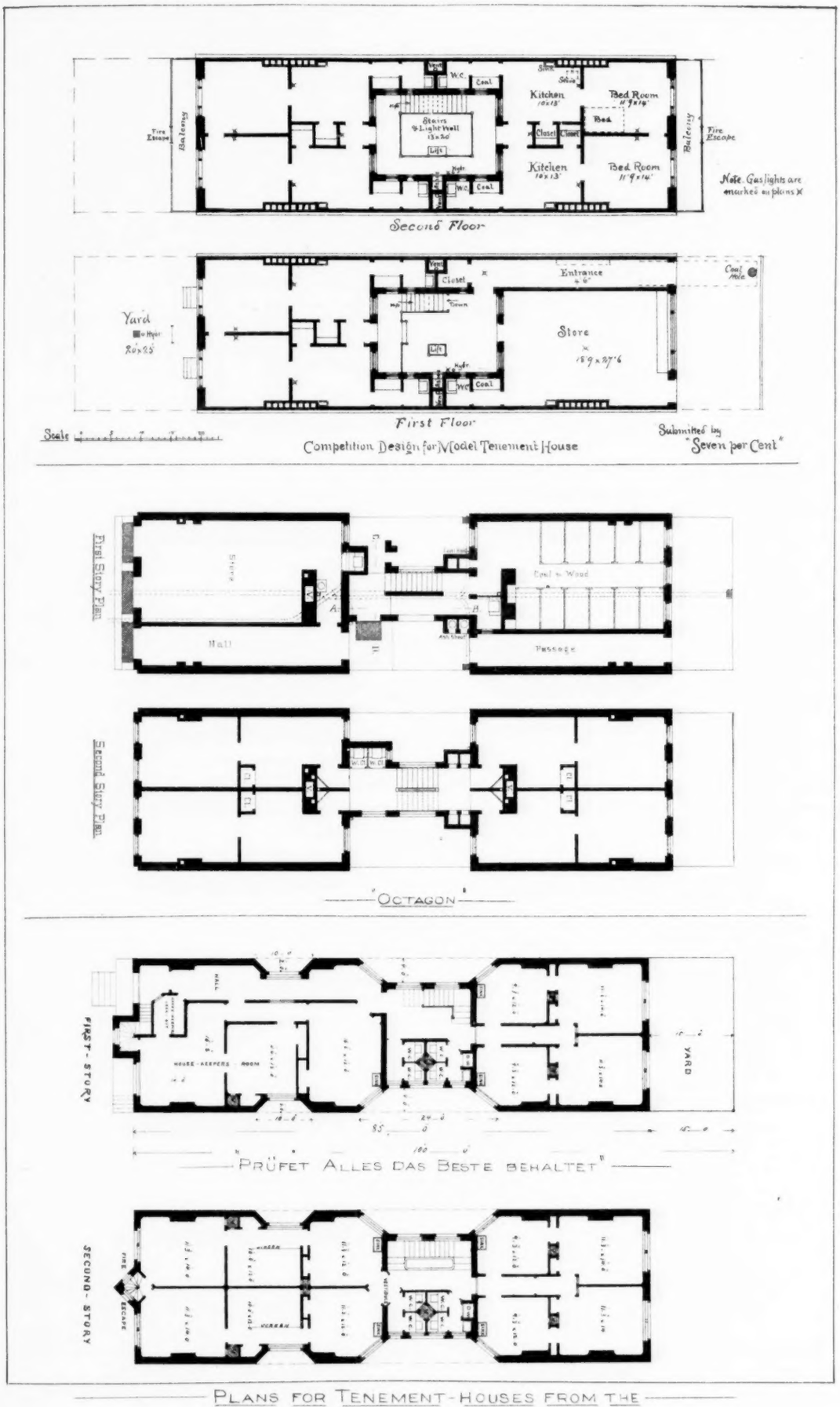
Revue Generale de l'Architecture et des Travaux Publics

First Story Plan

Second Story Plan



THE HELIOTYPE PRINTING CO. 220 DEVONSHIRE ST. BOSTON



PLANS FOR TENEMENT-HOUSES FROM THE "PLUMBER'S" COMPETITION.

tween the beams being filled with hollow cement blocks and the beams themselves being protected by layers of cement. The staircases are fire-proof. For ventilation much reliance has been placed on the doors and windows, but besides these a ventilating cowl would be placed over the stairway, and special foul-air ducts, marked V on the second floor plan, would assist the ventilation when doors and windows must be kept shut. All the water-closets are grouped about a ventilating shaft. The chimney would be built of blocks of artificial stone which have two sets of flues, the innermost range of which would be air-ducts for supplying the rooms with fresh air drawn from the outside, which would enter already slightly warmed by contact with the smoke-flues. The soil-pipes of the water-closets are carried above the roof, and each trap is ventilated by a separate pipe. Each suite of rooms has a water-closet of its own. Each suite of rooms is provided with a vestibule door which would insure privacy. A dumb-waiter or lift is provided for raising fuel to the different rooms, or the Monday washing to the roof. The estimated cost is $12,850.

CHEMICAL ENGINE STATION NO. 2, SYRACUSE, N. Y. MR. ARCHIMEDES RUSSELL, ARCHITECT.

This building is the property of Fire Commissioner Hamilton S. White, and is maintained at his expense. The interior finish is of cherry. The principal object in the arrangement of this building has been that the engine may respond to the alarm with the least loss of time. Cost, $6,000.

PAPIER-MACHÉ CAPITALS IN THE OPERA HOUSE, HOLYOKE, MASS., IN THE ORIENT INSURANCE BUILDING, NEW YORK, AND IN THE MUSIC HALL, BROOKLYN, N. Y.

ARAB DOORWAY AT CAIRO, EGYPT.

This doorway, which is reproduced from the *Revue Générale de l'Architecture*, is the entrance to a private dwelling in the Coptic quarter of the city and is one of the most complete and interesting types of a style of decoration which is much employed by the Arabs. The carving, which is admirably worked, is executed in a free-working stone. The tympanum between the lintel and the discharging arch is decorated with light-colored tiles. The house to which it belongs is probably not older than the last century.

HOUSE FOR C. J. CARPENTER, ESQ., NEW BRUNSWICK, N. J. MESSRS. POTTER & ROBERTSON, ARCHITECTS, NEW YORK.

THE EXHIBITION OF CONTEMPORARY ART IN BOSTON.

II.

BEFORE turning to the landscapes we will begin where we left off in our last issue, and continue with the portraits and *genre* pictures. Mr. G. Fuller is both portrait painter and landscapist. His mellow Boy (328) is admirably painted, save the hands. His study for the Runaway Girl (394) is a clever and suggestive sketch, but his Boy and Calf (318) is an interesting picture. The poetic feeling is there; his repugnance to the commonplace is manifest both in its conception and in its execution; yet the handling is disagreeable, and the "values" false. It looks as though it were glazed with the yolk of an egg. If nature should suddenly appear to mankind as Mr. Fuller has portrayed her, we believe that no one would be more surprised than Mr. Fuller himself. This artist apparently tackles his subject with, as the French say, *un parti pris*. The same remark applies to Mr. Tilton (432). Should an apparition of Venice, decked as he has decked it, unexpectedly reveal itself to the dumbfounded Venetians, Mr. Tilton doubtless would shout with the multitude, "A miracle! A miracle!" Mr. J. Whistler's slight but well-toned sketch (374) suggests the crowded court-room, the irate arch-critic, the pugnacious artist, and volleys of uncomplimentary epithets. In short, it suggests the ever-memorable trial, Whistler *v.* Ruskin. Mr. Winslow Homer sends two pictures illustrative of negro life, Sunday Morning in Virginia (404) and A Visit from the Old Mistress (308). It is the fashion to admire this artist's studies of American life. So do we from a certain point of view. They will always be interesting, just as old prints, descriptive of the customs and costumes of the epoch, are interesting. They amuse us to-day, and if preserved, will amuse the archæologist of the future. But as works of art, ah, that is a very different thing. There is no attempt at composition. "Values" are totally ignored, and the drawing (note the old woman in No. 306, supposed to be sitting) is very dubious. Mr. Homer relies on a sagacious choice of incident, and therein is the secret of his success. Mr. Wyatt Eaton exhibits a picture of the Jules Breton type, Harvesters at Rest (370). His group is happily composed and suggestive of well-earned repose. The air is murky with misty heat, and the laborers gladly recline in the shade of the heaped-up grain. The flesh lacks suppleness in treatment, and there is too much sustained heat everywhere. The figures are painted, not sunburnt. Miss Elizabeth Bartol has just those qualities that Mr. Eaton lacks. Her Portrait of Three Boys (376) vibrates with light. It is an admirable sketch. If we may judge from the subject, treatment, and signature of No. 306, Roman Girls, by Tito Conti, this picture should have been hung in the Allston room with the European works. Though cleverly handled, it is allied to a class of vulgar productions, savoring of models and dissipation that has done more to demoralize art than all the heresies rampant in our community. To what degradation this sort of thing leads may be seen in Mr. Humphrey Moore's After the Ball (468), which has not even the merit of being clever. Puritans, by Mr. C. R. Grant (319), is a noteworthy picture. It is refined and artistic. We can best express what we think of it by saying that it has no cheap qualities. The grays are delightfully varied, and the pure colors adroitly broken. The only blemish in the picture, and that a slight one, is the puckering of the blue dress on the shoulder of the girl standing, a blemish that somewhat mars her symmetry, and which the artist would have avoided were he more conversant with the human form. In his own interests, and in those of art, we trust that he will devote his leisure hours to studies from the nude and artistic anatomy. From its celestial position it would be difficult to form a true appreciation of Mr. Charles S. Reinhart's Wanderer (419) without the aid of a powerful lens. Viewed with the naked eye from the regions below it looks as though it deserved a less cruel fate. We should scarcely judge from Mr. F. A. Bridgeman's Oriental Interior that he was one of the few American recipients of French honors; but such is the fact. Mr. Louis C. Tiffany's picture, No. 347, can boast a capital sky, but the "reaper" himself is not the work of a figure-painter. The only other *genre* paintings worthy of notice are two diminutive but clever pictures, Nos. 431 and 401, painted respectively by Mr. W. L. Metcalf and Mr. Gangengigl, — the latter probably a foreigner.

In an American exhibition landscape always predominates. Under the circumstances this is natural. Not that our life lacks picturesqueness, as many suppose, but because our art is yet in its swaddling-clothes. Critics are in error when they assert that America is the place *par excellence* for landscape. In point of fact the eastern portions of our land (and possibly the western) are pictorially inferior to Europe, to the Levant, or to the northern shores of Africa. The "values" in French, English, or Dutch landscape, and the grand anatomical forms of the Mediterranean provinces, are vastly superior to the same qualities in our own scenery. We make these comparisons merely to prove that our surroundings do not inevitably impel us to landscape. No more does our genius. A glance at the foreign room will convince any intelligent person that we are not superior in this department to our friends across the sea. It is true that our life is not peculiarly picturesque (though there are phases of it worthy the brush), but picturesqueness is not the greatest quality in art. In fact it is one of the humblest. We do not paint the figure, because as yet we do not know it. We have opportunities of rendering the human form in its noblest state, opportunities which we neglect because we cannot render it. Our choicest youths contest their Olympic games before our eyes, and we let the occasion slip. Some painters have tried it; but how? Simply from the picturesque point of view. We do not wish to say that one branch of a profession is more difficult than another. To do anything well is no easy task. By industry and observation a man can translate inanimate nature well, provided he has it in him. But no one can creditably render the human form without a course of profound study. When our schools are older, our teachers riper, and there is a craving felt by art patrons for the higher qualities in art, then doubtless we shall produce worthy figure-painters.

From the number and importance of his pictures exhibited, Mr. J. Foxcroft Cole occupies the foremost place among the landscapists. He is a straightforward, simple lover of the truth, and therefore his pictures are sympathetic to one who delights in nature. He is not masterful. His large picture, Sheep-Washing in Normandy (390), is his best, if we may except the more unpretending No. 338, Spring, Melrose, which almost seems the work of another hand. This varying of execution according to the subject is to Mr. Cole's credit. Receipt painting is poor stuff. How often, by the way, must connoisseurs be deceived, who rarely take experimental pictures into account — as if one artist never struck out in a new direction! Mr. Cole's Jersey Bull (No. 326) is well drawn, and in parts admirably painted, but as a whole is opaque and leaden, particularly the landscape. We think that he is seen to greater advantage in the hall (Pasturage in Normandy, 202) than in the exhibition rooms. Mr. Thos. Robinson is but a second edition of Mr. Cole, with all his vices and none of his virtues. His Pastoral Scene, North Easton (313), is hard, opaque, and disagreeable in tone, though not without a certain rude vigor. Both these artists would do well to study the beautiful Van Marcke (521), a new importation, in the Allston room, to note its sparkling texture, looseness of handling, and masterly drawing. The cattle exhibit the greatest variety of form and color, from the pretty white calf to the fine black cow. The bit of landscape beyond is unrivalled, so fresh is it and strong, so solidly painted without being heavy. Mr. J. Appleton Brown's sketches (for we must call them so) have the true ring of nature, the genuine out-of-door feeling. Any one who loves the open air, the fleeting, fleecy clouds, the deep blue sky, who loves to feel the breath of nature on his cheeks, must also love Mr. Brown's studies. These are Nos. 371, Spring, 372, Saturday Afternoon, Autumn, and 445, Willows. Mr. R. Swain Gifford, too, strikes this out-of-door note. He develops his pictures more fully than does Mr. Brown; nor do they lose their freshness in the process. Nos. 410 and 413, Indian Summer, Dartmouth Moors, and Old Trees, Coast of Massachusetts, are excellent specimens of his brush. We regret that he contributes none of his water-colors, which are fully equal to his oils, if not better. Mr. George Inness is a veteran exhibitor, a warrior who has given and taken so many

hard knocks that it would be superfluous for us to add thereto. Those who are interested in his talent can see him at his best in No. 400, A Passing Thunder Storm, and at his worst in Nos. 384 and 411. Mr. E. M. Bannister sends us from Providence a powerful landscape, The Woodman. The gradations are good and the "values" admirable. Mrs. S. T. Darrah's Coast Scene near New Bedford is also strong and well sustained. Mr. Jewell, ever faithful, but without brilliancy in his studies, contributes an excellent picture No. 301, Mosque of Kaid-Bey, near Cairo. The reflected lights are particularly warm and clear, — a peculiarity of Eastern climes which we find wanting in Mr. E. L. Weeks's cold, sunless Street in Tangiers (No. 303). Mr. Jewell also exhibits a good Venetian study, No. 383. Were it not for the puerile figure and the bizarre panel, which seriously compromises its tones, we should admire Mr. Wm. Sartain's Arab Lane (344). We cannot compliment Mr. Frank Rogers on his dogs, No. 422. Were the picture less pretentious we should have passed it by in silence. Mrs. Ellen Sturgis Dixey's Jasmines (414) is an admirable bit of color, and well worth the attention of her flower-painting sex. No. 448, Still Life, by Mr. George Hoesslin, is good, inasmuch as it is a picture, and not a mere conglomeration of bric-à-brac equally lighted and equally finished from the centre to the frame. Mr. C. H. Miller's landscapes, 346 and 364, are rich and juicy, though a trifle spotty. Mr. Robert C. Minor's Evening (427) is also rich and mellow. It is interesting to compare such pictures as Mr. W. T. Richards's 327 with the modern landscapes. Verily, we have improved! We know that the duties of the hanging committee are no sinecure, that their task is a thankless one, but we cannot see why they should have hung (or rather we can see and reprove them for it) Mr. W. M. Brackett's live fish (458), pompously dubbed the Monarch of the Stream, in a place of honor. The public has too long been beguiled by such cheap art.

It is well that we should not linger in the Allston room. To pass judgment on the foreign pictures, many of which have been thoroughly discussed elsewhere, would necessitate a comparative analysis of the different European schools too elaborate for this notice. Let us pass on to the room where the drawings and water-colors are hung.

As far as *aquarelles* are concerned we are but babes. There is little temptation to excel in a department of art unappreciated by the public, save the temptation to be a pioneer, an innovator, a reformer. People are strangely prejudiced, or rather ignorant, concerning the durability of water-colors. The blackening and cracking pictures in the Luxembourg gallery warn us that pigments prepared with oil, if incautiously applied, are far more fugitive than either distemper or water-color. In our own experience we have never met with a deteriorated water-color, but we cannot say as much for oils.

Few of the water-colors are worthy of comment. Many of them are the feeble attempts of aspiring amateurs with a mania for exhibiting. They do not even deserve the notoriety of censure. Messrs. Tiffany and Sartain are New York exhibitors of reputation. Yet they are not pure aquarellists. The former's Cathedral of St. Melanie of Molair (583) is more distemper than water-color, and Mr. Sartain's An Arab Café in Algiers (585), has recourse to peculiar methods. Both seem studiously to avoid transparent washes, which give those qualities that are inimitable in other mediums. Like the modern English they would give to the water-color the texture of oils. Independent of the handling, Mr. Tiffany's picture is neither pleasing nor true. Very different in treatment is Mr. Wm. Tudor's Cool Day, Manomet (617). His strong, clear washes are very brilliant, and his touch is admirable. No. 616, Sketch near Ward's Pond, Brookline, is Mr. E. C. Cabot's best work. It savors strongly of nature. Mr. Cole is not at home with water-colors. He cannot master his materials. His touch is heavy and his color muddy. A water-color is nothing if not clean. Miss S. M. L. Wales and Miss Carter compete with their Interiors of Trinity Church, an inspiring subject. Mr. Charles H. Moore's Archway in Venice (No. 580) is a charming and faithful study. His Duomo Window-Head at Florence (591) should hang in the architectural room rather than in its present place. In no sense of the word is it a picture. It has neither effect nor concentration, and as a water-color is very opaque. In both studies we think Mr. Moore uses his white too liberally. Messrs. Langerfeldt, Colman, Werner, Nesfield, Nicoll, etc., represent schools that we recognize, but do not sympathize with. In their way they are excellent. Before laying aside the pen we must call attention to a very artistic charcoal head, by Miss E. H. Bartol, more fascinating even than her master's work eneath it, — No. 634, by Mr. Hunt. We close this notice as we opened it, by hoping that the present exhibition may not be the last of its kind.

CORRESPONDENCE.

THE MOSQUES AND TOMB-MOSQUES OF CAIRO.

I.

Cairo, 1879.

Long before the Egyptian coast can be seen, the tall light-house of Alexandria rises up on the horizon, and when the low line of land appears, the white walls of a palace upon the harbor's edge — where in the North would be warehouses — give at once the key-note of Egypt, with its luxury and waste, its extravagant palace sand mud huts. At Alexandria there is little to delay the visitor unless he cares to trace the plan of its former magnificence, for neither the mosques nor recent buildings are of especial interest. Rising on the ruins of its ancient splendor it is simply a modern Levantine port. Immediately on quitting it, however, for the few hours by rail to Cairo, a keen interest is roused at sight of the Nile and its wide, fertile plains, broken here and there by mud villages, which recall scriptural memories, for these mud huts are formed — one can hardly say built — of the same kind of sunburnt bricks upon which the children of Israel toiled, and which the Egyptians of to-day mould from the Nile mud by hand, while the Khedive's many palaces are filled with the last novelties of Parisian furniture!

At Cairo also there are strange contrasts. One walks from the new part of the town with its modern garden — a futile imitation under a Southern sun of the Parc de Monceaux — and its French theatre, into the narrow streets of the "Arabian Nights," gay with brilliant robes and white turbans of Mussulmans from all parts of the East. Apart from the endless interest of the street scenes, there is to the architect an equally inexhaustible one in the mosques, which, several hundred in number, — I believe there is no record of how many they really are, — are full of attractions, both carven and colored. Following the main street from the European quarter across the city, one comes to sand-hills which like a rampart bound the desert. These offer a fine standpoint from which to study the characteristics of the city. The eye wanders over a multitude of slender minarets and graceful domes to the palms fringing the Nile, and beyond to two great pyramids against the horizon, those of Gizeh. Two classes of minarets may be easily distinguished: those which rise in several stories, square, octagonal, and circular, accentuated with balconies upon stalactite *encorbellements*, belong to early periods, from the ninth down to the sixteenth century, — the earliest mosques having no minarets, — while the others, of a single slender shaft with only one balcony about one third of the height from the top, are more recent, and indicate Turkish influence. The former have a wonderful beauty both of proportion and of delicacy in detail. It is curious to note that instead of passing from square and octagon to the circle, as is done in Western towers, they here almost never terminate in a cylindrical story, but usually the cylinder is between the square and the octagon. It is evident that the octagon as a crowning member is more firm and elegant and gives sharper shadows than the cylinder. The domes are of great elegance, usually well raised, and tending to the form which in the arch is called "keel-shaped," that is, slightly flattened towards the top and rising again at the apex. They are carved with ribs or zigzags and sometimes with intricate arabesques. These domes mark the second period of mosque building. The first mosques, which date from the eighth century, consisted simply of a large court, with a fountain for ablutions, surrounded by two or three ranges of arcades, which are increased in number on the side containing the sacred niche, — showing the direction of Mecca, to be faced in prayer; near this is the pulpit, which is entered under a door-frame, and a dozen steps lead to a small platform with a canopy. This design for the pulpit, whether of carved stone or of wood inlaid with ivory, as well as that of the sacred niche with its rich mosaics, seems to have remained the same through all the developments of mosque building. The mosques of the eighth century have a perfectly developed style of the pointed arch, which thus antedates by three centuries the general adoption of the Gothic arch in Europe, and as the date of the Gothic style corresponds with the return of the Crusaders from the East, it is probable that they brought back with them, if not the invention of the pointed arch, at least a fashion for it inspired by this light and beautiful Saracenic architecture. The first change in these early arcaded mosques came in the twelfth century, by the addition at one or two of its corners of a domical chapel over the tomb of the founder. After this the open courts were gradually contracted until they disappeared, and the several aisles of the sanctuary were absorbed into a large hall roofed with richly decorated palm beams; this opens into the central court under the span of one great arch; single arches open from the other three sides of the court into other halls equal to, or smaller than, the first one. The central court is roofed and lighted by a lantern of lattice work.

The prototype of this latter class is the noble building which Sultan Hassan in the fourteenth century built as his tomb, probably the finest example of an Arabian mosque. Standing upon rising ground, just below the citadel, the approach to it by a wide modern boulevard adds to its impressiveness, which is rather that of a great military or civil building. There are no less than eight stories inclosed in its lofty flat niches. Of the same height is the wing or pavilion in which is situated the great niche of the vestibule, whose *conque* filled with stalactite work is less graceful in outline than many more humble examples. Either for defence, or from the shape of the site, — for the mosques seem to have been unhesitatingly adapted to the crooked lines of the streets, — the narrow corridor which leads from this grand portal turns at a sharp angle. While still wondering at this incongruity one steps into a most imposing court, whose lofty walls are crowned by a stone ornament resembling a double fleur-de-lis, whose sharp silhouette it is which in Arabian architecture generally replaces a cornice. From each side of this court opens a gigantic niche or rather apse, vaulted with a simple pointed barrel-vault; these for size and impressiveness are unrivalled; the severity of the bare walls and vault being relieved by the chains of a multitude of hanging lamps. The fountain in the court is roofed by a bulbous dome whose exquisite decorations in color are fast disappearing; in fact, this grand old mosque is fast going to ruin, for want of a little

timely repair. From the recess towards Mecca opens the chapel of the founder, roofed with a noble dome, brought down upon the square plane by enormous pendentives, reaching half way to the floor. Thanks to the dilapidation of one of them I discovered that their stalactite work was of wood, and not of stone, as it appears, at least to Northern eyes, for once seeing their construction revealed, the function of the pendentives seems frankly that of a mask, as they are attached behind to a beam which steadies an arch sprung across the corner to support the dome. The walls of this chapel and the apse towards Mecca are richly adorned with mosaics and inscriptions. Inscriptions in the graceful Arabic or older Kufic characters are one of the chief beauties of Saracenic architecture. Painted or carved in bands or panels, their invariably good effect suggests the possibility of doing something with our Old English or Black-Letter alphabet, as their forms would lend themselves better than our common alphabet to gracefully covering a given surface; not that the Arabians always occupy the space uniformly, as often they twine their lettering in rather in groups.

Though the mosque just described is the grandest example of the Arabian style, the later buildings went on gaining organic unity and delicacy, though the buildings were afterwards on a smaller scale. The most perfect of this latter class are the mosques and tombs of Kaid-Bey. The latter is one of the group of tomb-mosques just out of Cairo, commonly called the "Tombs of the Khalifs," and, though small, has the most perfect exterior of any of the mosques. Its intricately carved dome and richly designed minaret are the most perfect examples of their kind. On the other hand, the mosque built by the same founder in the city has the most delicately designed interior. The plan of these two mosques is identical and is a typical one. In the centre a court — whose rich roof is pierced by a lantern of lattice work — gives access to two large and to two small niches or apses. On each side of the smaller arches are decorated flat niches, each inclosing a small window, while delicate stalactites fill the *conque*. The classic builders would have sunk their niches deep in the wall, destroying, by these small cavern-like holes, the breadth of the design. But the Arab, with his fine feeling for the value of surface, has kept them shallow and so filled the *conque* with delicate prismatic work, thus engraving his design upon the wall rather than piercing it. I used the word prismatic work, because this delicate *motif*, with its flat triangular niches overlapping one another, is quite different from the real stalactite work with pendants, though commonly all the species of this geometrical corbelling go under the name of stalactite work. Beginning with simple constructive divisions in the vaulting of their niches, this geometrical system can be traced into mazes of intricacy, where the eye with difficulty can discover any controlling principles of geometry. Yet they may be found by study, and from this fact I doubt that imitation of natural stalactites was the origin of this most characteristic of Saracen motives. In it they found full vent for the active fancy which revelled in arabesques and all lineal combinations, for besides using it to fill all awkward corners and to adjust different planes, designers never seem to have hesitated at a difficulty without finding a solution in this ingenious ally. R.

ARCHITECTURE AT THE EXHIBITION OF CONTEMPORARY ART.

BOSTON.

THE architectural exhibition has a sort of every-day look, which is not at all to its discredit, but on the contrary adds greatly to its interest in the eyes of any one who desires to see what sort of buildings are getting built nowadays. There are perhaps no drawings here which have been prepared for this occasion, — few indeed which appear to have been prepared for any occasion beyond the ordinary business of the office. It is a collection of office drawings, covering almost every variety of subject, from a stable to a university, and every style of rendering, from the slightest preliminary sketch in lead-pencil to the most elaborate perspective in water-color, with landscape thrown in. Nothing could be contrived more interesting to the professional architect, as showing him at a glance the various habits of design and methods of drawing among his brethren; the only regret is that the collection could not have been made to embrace the work of more architects from other cities, less familiar to the great majority of vistors. Eight architects from New York have sent drawings, and one from each of the cities of Providence, Philadelphia, Baltimore, and Cincinnati. With these exceptions, the collection of some one hundred and fifty drawings is the work of Boston men exclusively.

As to number, the country houses probably carry the day; there are between thirty and forty of them, and they are not the least interesting part of the collection. If a national American style is ever evolved from our somewhat confused practice, it ought to make its début in the country house, where the habits of family life and the almost universal use of wood for the walls combine to make it more difficult, as well as more unreasonable, to follow the style of foreign nations than in public edifices or the buildings of city streets. It is therefore peculiarly encouraging to mark the steady improvement in this class of buildings, and the increasing tendency to solidity of design; this is equally seen here in the houses of Messrs. Cabot & Chandler, Mr. Emerson, and Mr. Carl Pfeiffer, widely as they vary in other respects. I fear the extreme solidity is sometimes rather apparent than real, and that the massive timber framing so conspicuously indicated on the surface would not be discovered on reaching the skeleton. But this, if it be a vice, is a pardonable one, if for nothing more than the homage it pays to the answering virtue. I wish it could be said that with the increasing solidity an increasing simplicity went hand in hand, but I think the plans and the composition grow even more studiously irregular and tormented, in the search for the picturesque. In this respect the designs of Mr. McKim, of which two or three are here shown, though eccentric in plan, and affecting, perhaps, in too marked a degree, the style of the ancient English manor house in the days when people had not yet learned how to live comfortably, are yet a relief; for running all to length as they do, they afford the long, unbroken ridge-lines and broad, quiet surface of low wall and roof which give repose to the design. One of Mr. Pfeiffer's designs, No. 766, a country house, mostly of wood, skilfully broken up, but whose masses are brought into harmony and subjection by a round tower of stone with an open loggia at its top, crowned with a strong conical roof, seems to me to have nearly hit the mark in combining picturesqueness with dignity.

Of city houses, as of street buildings, very few are shown. Messrs. Ware & Van Brunt's design for a house in New York, two designs of Mr. Lewis for houses on or near Commonwealth Avenue, and a quiet and simple yet sufficient front by Messrs. Cabot & Chandler on Marlboro' Street, are all that occur to me among the former class, if I except Mr. Luce's picturesque house at the foot of Mount Vernon Street, which belongs rather among the country houses. Of street buildings, I remember chiefly Messrs. Peabody & Stearns' two façades for the Howard Bank, and their perspective of the Mutual Life Insurance Building, Mr. Preston's fine drawing of the proposed building in Liberty Square, Messrs. Sturgis & Brigham's outline elevation at large scale of the Hunnewell Building, a figured working drawing such as ought to appear oftener among the more showy perspectives, and a dark little photograph of a small building in New York by Mr. Stratton, called the School of Industry, a low brick front, with round arches undecorated, and a broad flat oriel running through two stories, the whole treated with great reserve and refinement.

Of more important public buildings, we observe Mr. McArthur's large drawing of the Philadelphia city buildings, in which, notwithstanding their extent and costliness, it is impossible to feel much interest, Messrs. Sturgis & Brigham's fine Renaissance design for the Chicago Court House, and Mr. Post's New York Hospital, a large, lofty, many-windowed façade, quiet and well managed, but whose five stories make one shudder at the risks to which some hundreds of helpless wretches are needlessly exposed. Messrs. Ware & Van Brunt's study for college buildings is an interesting project, and, though but a sketch, is carried far enough to exhibit ingenuity in planning and grace in design. Three of the competitive designs for the Milton town hall are here, but scattered in various parts of the room; it is a pity they could not have been hung together and the rest added. Indeed, if one were disposed to grumble, he might say some savage things about the arrangement or lack of arrangement of the drawings in these rooms. There is no classification as to subject, authorship, style of drawing, or anything else, and worst of all some interesting drawings are hung so high as to be quite beyond an ordinary eyeshot. A pen-and-ink drawing by Mr. Luce of some of the decoration of the Holyoke opera house, which one would like to examine somewhat nearly, is not even hung at all, but is set up on top of one of the cases. All this seems the more unnecessary that one of the architectural rooms is by no means full, but has room on its walls for many more drawings at a reasonable height.

Very few interiors are to be seen, which is remarkable, considering the attention which is now paid to the interior decoration of dwelling houses. The only example I remember as noticeable is No. 701, by Messrs. Cabot & Chandler, a dining-room, long and low, treated with great simplicity and gravity, and quite free from that overmuchness of design which is the especial bane of our domestic architecture. A.

WESTERN ARCHITECTS.

LAWRENCE, KAN., May 3, 1879.

TO THE EDITOR OF THE AMERICAN ARCHITECT:

Dear Sir, — Your New York correspondent, in his criticism on the competitive designs for the new Union League Club House of that city, seems to use unnecessary harshness with reference to building committees of Western towns, and impliedly to Western architects. This, from the standpoint of the profession in the West, is entirely uncalled for, and is getting too stale to be good. All of the Western architects are men of Eastern training, anxious and earnest in their endeavors to advance the prestige of their profession; and without the many advantages to be derived from institutes, and the opportunities to copy details from fine buildings on every hand, they are trying to work out their own salvation.

Nine tenths of the casualties resulting from poor construction occur in Eastern cities and towns, and while our public institutions do not boast of as fine exterior effect and elaborate detail, they are certainly as well arranged and as well constructed as Eastern buildings.

In competitions in Eastern cities in which Western architects have engaged, we find them holding their own against their highly cultured and all-wise brethren of the orient: notably in the recent case of the Patent Office restoration and extension, and in the competition invited by the editors of the *Sunday School Times* (Philadelphia)

for a Sunday-school building, where the first premium went to Cincinnati, the second to Princeton, Ill., and the third to Kansas, while one from New York city and another from Philadelphia received honorable mention; this was out of fifteen competitors. The building was ultimately erected in Philadelphia as a combination of the Cincinnati and Kansas plans.

Let us have no more of these scurrilous allusions. We do not ask for undue praise, nor to be *patronized*, but we do ask to be let alone.

Yours, etc., Western Progress.

PUBLICATIONS RECEIVED.

Thirteenth Annual Report of the Trustees of the Astor Library to the Honorable the Lieutenant-Governor of the State of New York and President of the Senate. January 8, 1879. Senate Document No. 11.

First Biennial Report of the Trustees, Architect, and Treasurer of the Illinois Eastern Hospital for the Insane, at Kankakee, October 1, 1878. Springfield: Webb, Magie & Co., State Printers. 1879.

Improved Dwellings for the Laboring Classes. The Need, and the Way to Meet it on strict Business Principles, in New York and Other Cities. New York: G. P. Putnam's Sons. 1879.

Tenth Annual Report of the State Board of Health of Massachusetts. January, 1879. Boston: Rand, Avery & Co., Printers to the Commonwealth. 1879.

NOTES OF EXPERIENCE AND INEXPERIENCE.

22. Wells and Cesspools. — If the open drain tiles are within twelve inches of the surface, the pollution of the soil is almost nothing, probably by reason of the rapid oxidation of the organic matter by the air contained in the pores of the upper soil. "Open-Joint" will remember that where sewage is thrown directly on the surface, the effluent water, after filtration through a few feet of soil, is purer than most drinking-water. If a ledge of rock sloped from the vicinity of the outlet drains towards the well, or if the soil were very porous, it would be safest to use precaution. By making a little diagram, showing the levels and distances of the bottom of the well and the first outlet drain-pipe, an approximate judgment could be made of the likelihood of any matter reaching the water. Supposing the liquid to diffuse itself through the ground up to an angle of thirty degrees with the horizon, if that line did not reach the bottom of the well, it might be considered absolutely safe, unless in case of the existence of a ledge. If the soil were very porous, the angle would be greater; if very compact, it might be less; but the compactness would restrict the diffusion. This might be called precaution with a large factor of safety, for the small discharge from a few feet of pipe out of hundreds would be insignificant compared with the efflux from a leaching cesspool, forced through the ground often by a hydrostatic pressure of ten or twelve feet of water, and of course pouring itself mostly through the easiest channel whenever it has found one. C.

22. Wells and Cesspools. — One might as well ask, How far must I keep from a small-pox patient to be safe from infection? It is easy to say in answer to both, Keep as far away as you can; but the writer would not consider it safe to have an open joint in a drain nearer to a well that is used for drinking-water than ten times the vertical depth of the bottom of the well below the level of the nearest "open joint." It is often immaterial whether the *top* of the well is higher or lower than the drain. The *bottom* of the well is the point from which you get your water, and if this bottom is lower than the leaky drain by ten feet, it should not be nearer than one hundred feet, depending on the nature of the soil; some cases would render even this an unsafe proximity. Many drains that are supposed to be tight are laid close by the wells without much thought, while a slight imperfection in workmanship, or a slight heaving by frost, or settlement, may make every joint an open one, from which the sewage may escape. Any drain is therefore a bad neighbor to a well, without the most thorough workmanship and painstaking. Edw. S. Philbrick.

20. Brick Drains *vs.* Glazed Drain-Pipe. — "Pump Chain's" trouble with his drain-pipe is only the inevitable consequence of the use of anydrain for sink waste. Perhaps a little more care about throwing grease down, and some means for protecting the pipe to the trap from losing its heat and so chilling the grease, such as wrapping it with hair-felt where exposed, together with an occasional washing out with a solution of caustic potash, would help him. Probably the joints in the pipe were not properly cleaned out, and the projecting cement catches the sediment.

The old mason's assertion about the superiority of brick drains is simply an illustration of the amazing ignorance and carelessness of the average mechanic about his own business. In the language of a circular which I received this morning, "Scientific theories is the cause of so much loss and disappointment to purchasers of furnaces;" and not only furnace makers but other manufacturers and mechanics seem carefully to avoid the dreaded contamination of scientific knowledge. I have heard a foreman of masons assert that lime mortar set more quickly than cement; a first-class plumber say that block-tin pipe corroded faster than lead; and have seen a carpenter truss a partition with the truss upside down, plasterers put hair into the fresh slaked lime and leave it for days, and many other gross displays of ignorance of the one business which they professed to understand. The poor architect, who, when he specified a truss, had not supposed that it would be necessary to state which side of it should be uppermost, generally gets the blame for these little errors on the part of the workman; while the workman, when the ceilings crack, or the plastering falls off, or the drains, which he has laid on an up-hill grade, begin to choke, accounts to the owner for everything by mournfully hinting that too much "book-larnin'" was in some way, he does not say how, the source of the trouble.

T. M. C.

20. Brick Drains *vs.* Glazed Drain-Pipe. — We wonder if the mason who thinks that a brick drain is more self-cleansing than a pipe drain is accustomed to eat his dinners from unglazed pottery? If he really believes his own theory, he ought to carry it into practice by discarding all glazed crockery-ware from his home, and eating his meals from flower-pot saucers. He would save much expense thereby, and if he is right, it would be more cleanly.

If "Pump Chain" will read in the last Report of the Massachusetts Board of Health, just published, the article by Mr. E. C. Clarke on "Defects in House Drains," he will find the question more fully and satisfactorily answered than your columns have room for. Edw. S. Philbrick.

NOTES AND CLIPPINGS.

The Statue of Liberty. — The French Minister of the Interior has authorized Senator Martin, Vice-President of the Committee of the Franco-American Union, to organize a lottery of three hundred thousand one-franc tickets, to raise a fund for the completion of Bartholdi's Statue of Liberty, which has been presented to the United States, and is to be put up on Bedloe's Island, New York Harbor.

The Cuneiform Inscriptions at Nineveh. — "One of the principal objects kept in view during these new excavations," says Mr. Grattan Geary in speaking of the excavations now making at the site of Nineveh by Mr. Hormuzd Rassam, "is the recovery of the remainder of the historical and legendary tablets, which were deposited in the royal libraries. The completion of the series giving the Isdubar legends, amongst which the account of the Deluge is the most remarkable, is above all things desired. The tablet giving the portion of the legend relating to the Deluge, which was first deciphered by the late Mr. George Smith, was discovered by Mr. Rassam; and therefore there is a special fitness in his being intrusted with the task of completing the search subsequently begun by Mr. Smith for the tablets still required to complete the series. He was so far successful in his operations that he had, within a few months of my arrival, discovered nearly fifteen hundred tablets, or portions of tablets, bearing cuneiform inscriptions. Additional parts of the Isdubar legends are amongst them, as well as lists of gods, many prayers and invocations, and other matters throwing light upon the religion of the Assyrians. Not the least valuable of the cuneiform records found would have been lost forever but for the steady observance of the rule that nothing, however unpromising, was to be passed over. In excavating in the royal library of the palace of Sardanapalus — or Assurbanapal — a piece of wall, four or five feet high and eight or ten long, composed of sun-dried brick, stood exposed. All the débris around it had been removed and sifted, and nothing more was looked for. It was proposed to throw the rubbish from a new part of the cutting in the cleared space, and cover up the bit of useless wall. But Mr. Rassam directed that the wall should be first knocked down. In removing it the men came upon a literary treasure, equal in importance to any yet recovered from the whole site. Built into the wall, and as it were imbedded in the sun-dried bricks, was a large decagonal terra-cotta cylinder, some twenty-two inches long and two feet in circumference. It sides are closely covered with very small cuneiform characters, in ten columns, exactly like those of a modern newspaper. There are 1,275 lines in all, containing an elaborate account of twenty years of the reign of Assurbanapal, and all his wars against Egypt. The columns are nearly the width of those of an average daily newspaper, and rather more than half their length. The subject is divided into sections by what a printer would call 'rules' across the columns. Some sections occupy half a column, others a column and a half. We may expect great things from the translation of this most elaborate chronicle. It dates from the year 640 B. C."

An Unusual Compliment. — On the completion of the building in Cincinnati which is to be used as the Club-House of the Allemania Society, Mr. Nathan Drucker, on behalf of the society, presented Mr. James W. McLaughlin, the architect, with a set of resolutions, accompanied by a beautiful silver service.

Paintings in the Palace of the Popes at Avignon. — The first question with which the new Commission for the Preservation of Historical Monuments in France is interesting itself is, What is the best means of preserving and restoring the paintings in the Palace of the Popes at Avignon, which are in daily danger of injury by the French soldiers, who are quartered in the building as barracks? The paintings are of Italian origin, and date from the fourteenth century.

The New Haven State House. — The condition of the old State House at New Haven is such that the attention of the authorities has been called to it regarding its safety. It is feared that the snow and frost of another winter will cause the falling of the west wall, which has already settled away from the building nearly a foot.

Artificial Sandstone. — *Glaser's Annalen* contains a description of an improved method and apparatus for the manufacture of artificial sandstone. A thorough mixture of four to six parts of fine sand and one part of slaked lime is exposed for about three days to a high temperature and a pressure of more than three atmospheres, causing the formation of a silicate of lime which acts as a cement, so that the mass, when cooled down to the ordinary temperature, hardens. This hardening process continues for some weeks by exposure to the air, so that finally a product is obtained which is as hard and solid as good sandstone. The apparatus consists of a tank, into which the mixture is filled, and in which it is heated and stirred by a steam pipe, provided with a number of arms and rotated by belting or gearing. After the mixture has reached the proper temperature the steam is cut off, and a second vessel, inclosing the tank on all sides, is put into communication with the boiler. By this means the mass is heated for the period necessary. It is then run into a brick machine and shaped into the forms required. The process, it is claimed, effects great economy, especially for the manufacture of window-sills, etc. The apparatus used is made large enough to produce 250 cubic feet of material in every charge, — requiring, generally, three to four days.